

WHAT IS CLAIMED IS:

1. A method for acquiring operating parameters in a communications system operable to transmit a data signal, the method comprising the steps of:

generating at least one operating parameter carrier having a frequency value in a vicinity of a null of a data spectrum of the data signal;

modulating the at least one operating parameter carrier;

summing the operating parameter carrier with the data signal;

transmitting the summed signal; and

recovering the at least one operating parameter carrier from the summed signal.

2. The method of claim 1 wherein the generating step generates at least another operating parameter carrier having another frequency value in the vicinity of the null of the data spectrum.

3. The method of claim 1 wherein the communications system comprises at least one optical channel.

4. The method of claim 1 wherein the at least one operating parameter carrier is a sinusoid.

5. The method of claim 1 wherein the data spectrum of the data signal comprises a plurality of nulls, the method comprising the further steps of:

generating at least another operating parameter carrier having a frequency value in another of the plurality of nulls; and

summing the another operating parameter carrier with the data signal,

wherein the recovering step recovers the another operating parameter carrier.

1 6. The method of claim 5 wherein the communications system comprises a wavelength
2 division multiplexed communications system.

1 7. The method of claim 6 wherein the data spectrum is an RZ spectrum.

1 8. The method of claim 6 wherein the data spectrum is an NRZ spectrum.

1 9. The method of claim 8 wherein the demodulating step includes the further steps of:
2 transmitting RZ format data; and
3 recovering NRZ format data from the RZ format data.

1 10. The method of claim 1 further comprising the step of bandwidth limiting the at least one
2 operating parameter carrier.

1 11. The method of claim 1 wherein the demodulating step further includes the step of
2 bandwidth filtering the summed signal.

1 12. A method for optical channel operating parameter acquisition in a communications
2 system operable to transmit an NRZ data signal, comprising the steps of:

3 determining a spectrum for the NRZ data;

4 generating a first sinusoidal operating parameter carrier having a frequency at a first null
5 in the spectrum and a second sinusoidal operating parameter carrier having a frequency at a
6 second null in the spectrum, the second null being successive to the first null in the spectrum;

7 summing the first operating parameter carrier, the second operating parameter carrier and
8 the NRZ data signal;

9 transmitting the summed signal; and

10 at a receiver, recovering the operating parameter carriers from the summed signal.

1 13. The method of claim 12 wherein the optical operating parameter carriers are modulated
2 by NRZ operating parameter data, the method comprising the further steps of:

3 representing the NRZ operating parameter data in RZ format;

4 modulating the first carrier with the RZ format data; and

5 modulating the second carrier with the RZ format data,

6 the recovering step including the step of processing the RZ format data to provide NRZ
7 operating parameter data.

1 14. The method of claim 12 wherein the recovering step includes the step of bandwidth
2 filtering the summed signal.

1 15. A communications system comprising:

2 a channel;

3 a transmitter for transmitting a data signal, the data signal having a spectrum, the
4 transmitter including:

5 an operating parameter carrier generator operable to provide an operating
6 parameter carrier at a frequency having a value in a null of the spectrum; and

7 a summer for summing the operating parameter carrier and the data signal,
8 wherein the transmitter transmits the summed signal over the channel; and

9 a receiver for receiving the summed signal, the receiver operable to recover the operating
10 parameter carrier.

1 16. The communications system of claim 15 wherein the spectrum includes a plurality of
2 nulls, the generator operable to provide another operating channel parameter carrier having a
3 frequency in a successive one of the nulls.

1 17. The communications system of claim 16 wherein the operating channel parameter
2 carriers are sinusoidal.

1 18. The communications system of claim 15 wherein the receiver includes a bandwidth filter
2 for recovering the operating parameter carrier.

1 19. The communications system of claim 15 wherein the transmitter includes a filter for
2 bandwidth limiting the summed signal.

1 20. The communications system of claim 15 wherein the channel includes an optical channel,
2 the summer including an optocoupler.

1 21. The communications system of claim 20 wherein the communications system implements
2 WDM.

1 22. The communications system of claim 21 wherein the data signal is an NRZ data signal.

1 23. The communications system of claim 22 wherein the spectrum includes a plurality of
2 nulls, the generator operable to provide another operating channel parameter carrier having a
3 frequency in a successive one of the nulls.

1 24. The communications system of claim 23 wherein the operating channel parameter
2 carriers carry RZ format parameter data, the receiver further including a processor for providing
3 NRZ format parameter data from the RZ parameter data.

1 25. The communications system of claim 15 wherein the operating parameter carrier is a
2 sinusoid.

1 26. A communications system operable to transmit over an optical channel, comprising:
2 a transmitter for transmitting a data signal, the data signal having a spectrum, the
3 transmitter including:
4 an operating parameter carrier generator operable to provide a first sinusoidal
5 operating parameter carrier and a second sinusoidal operating parameter carrier, the first carrier
6 having a frequency located in a null of the spectrum and the second carrier having a frequency
7 located in a successive null in the spectrum, and
8 a summer for summing the operating parameter carriers and the data signal,
9 wherein the transmitter transmits the summed signal over the channel, the carriers being
10 modulated by NRZ operating parameter data; and
11 a receiver for receiving the summed signal, the receiver including:
12 a demodulator operable to recover the operating parameter carriers; and
13 a processor for providing NRZ operating parameter data from the RZ operating
14 parameter data.